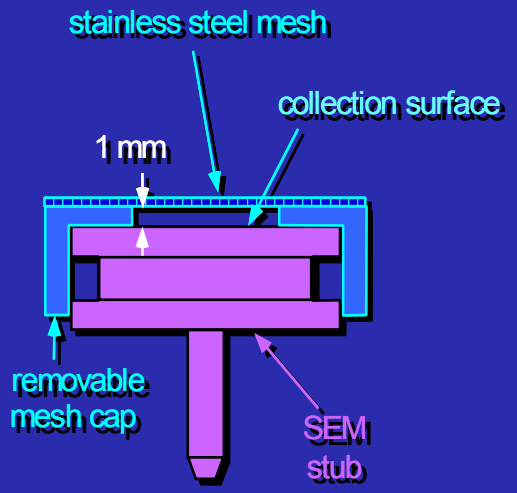
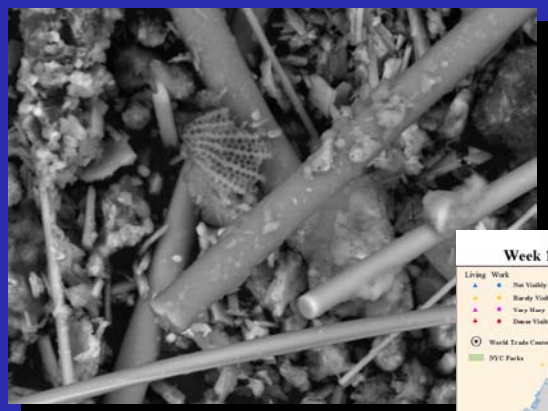
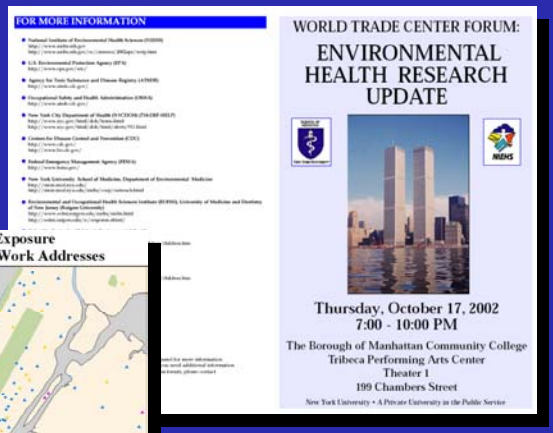
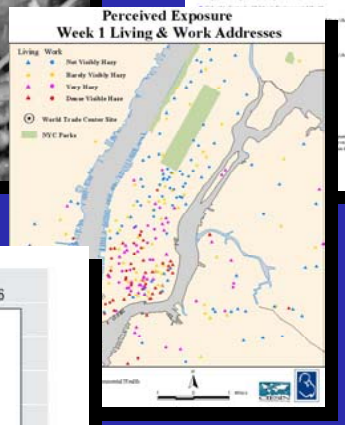
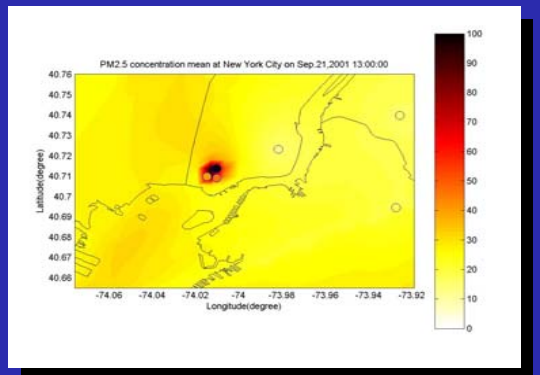
NIEHS Briefing On WTC Research Activities: Exposure Assessment, Health Effects and Public Outreach











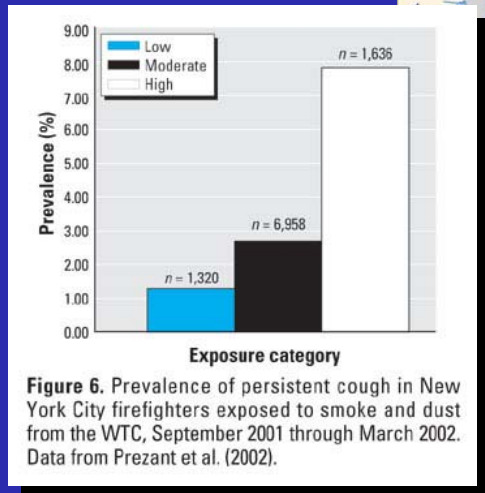
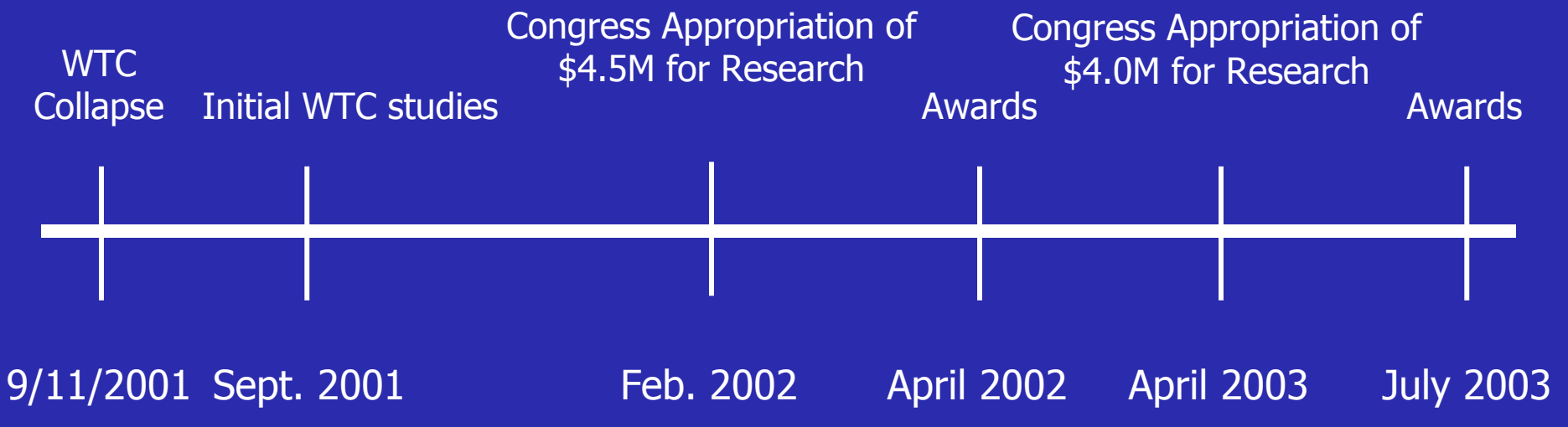


Figure 6. Prevalence of persistent cough in New York City firefighters exposed to smoke and dust from the WTC, September 2001 through March 2002. Data from Prezant et al. (2002).

Claudia Thompson, Ph.D.
Program Administrator
NIEHS

Timeline of NIEHS WTC-Related Activities



Initial NIEHS WTC-Related Activities

September 2001

NIEHS awards 250K of its own funds to grantees

- conduct personal exposure assessments
- collect and analyze dust and air samples
- conduct respiratory health study
- initiate epidemiology studies
- provide exposure information and fact sheets to communities
- develop a physician's advisory regarding WTC-related clinical conditions

Examples of Early WTC-Related Activities

- **Sept 2001** Collaboration between NYU, UMDNJ, EPA-NERL - **Dust samples collected at over a dozen locations surrounding WTC disaster area and bulk samples of settled dust/smoke analyzed**
- **Sept 2001** Collaboration between Mount Sinai and NYCDH. **Provided industrial hygiene and clinical expertise and developed fact sheets regarding health concerns**
- **Oct 2001** Collaboration between Johns Hopkins, Columbia, International Brotherhood of Teamsters, NYC Teamsters Locals 282 and 831. **Personal exposure assessments and area monitoring**
- **Oct 2001** Collaboration between Columbia, local unions, council members and community boards. **Conducts community forum for residents of Harlem, East Harlem and Washington Heights**
- **Nov 2001** Collaboration between NYU and EPA-NERL. **Collect and analysis indoor dust samples south of Ground Zero**

Department of Health and Human Services | National Institutes of Health | National Institute of Environmental Health Sciences

Congressional Appropriations

In 2002 and 2003, VA HUD and Independent Agencies sub-committee of Congress provides NIEHS with funds to support WTC research activities in the following areas:

- **exposure assessment**
- **clinical and epidemiology studies**
- **community outreach**

Awardee Institutions

- Columbia University
- Johns Hopkins University (JHSPH)
- Mount Sinai School of Medicine (MSSM)
- New York University (NYU)
- University of Medicine and Dentistry of New Jersey (UMDNJ)
- University of North Carolina, Chapel Hill (UNC)

Environmental Exposure Assessment Activities

Sample Analysis

- An exposure assessment of indoor air quality (UMDNJ).
- Analysis of collected air and dust samples (Columbia)
- Analyze soils and sediments in NY harbor and urban park lakes (Columbia)
- Analysis of collected indoor and outdoor settled dust samples and air samples for elemental and chemical composition (NYU)
- Analysis of PAH levels in filter samples gathered by EPA at ground zero during the weeks following the WTC collapse (UNC)

Exposure Assessment Activities

Exposure Models

- **Analysis of ambient conditions at the WTC site one year later (NYU)**
- **Exposure assessment employing NASA's Airborne Visible Infrared Imaging Spectrometer (AVRIS) for remote sensing imagery for quantitative assessment of WTC plume emissions (Columbia)**
- **The development of a GIS/RDBS micro-environment model (UMDNJ)**
- **Spatiotemporal mapping (UNC)**

Human Health Effects Research

Worker Populations

- A clinical and epidemiology study of ironworkers at the WTC to investigate respiratory abnormalities and Post-Traumatic Stress (MSSM)
- A WTC-NYC firefighters clinical study to assess cardio-pulmonary effects (NYU)
- Registry of WTC site clean up workers (JHSPH)
- Respiratory symptoms and psychological health assessment of WTC workers (JHSPH)
- Personal exposure assessment of WTC workers (JHSPH)

Human Health Effects Research

General Population

- WTC resident respiratory impact study to examine prevalence for respiratory symptoms, especially new onset of asthma-like symptoms (NYU)
- An epidemiological study of pregnant women and children to assess pregnancy outcomes and relationships to fetal/child development (MSSM & Columbia)
- A reproductive outcome study (UMDNJ)
- A qualitative risk assessment to assess perceived community concerns and documentation of actual risks (UMDNJ)
- Integrate exposure data with residents post-traumatic stress, depression and panic (UMDNJ)
- A pilot study to initiate validation of a newly developed personal passive air particulate monitoring device (UNC)

WTC Resident Respiratory Impact Studies

Goals

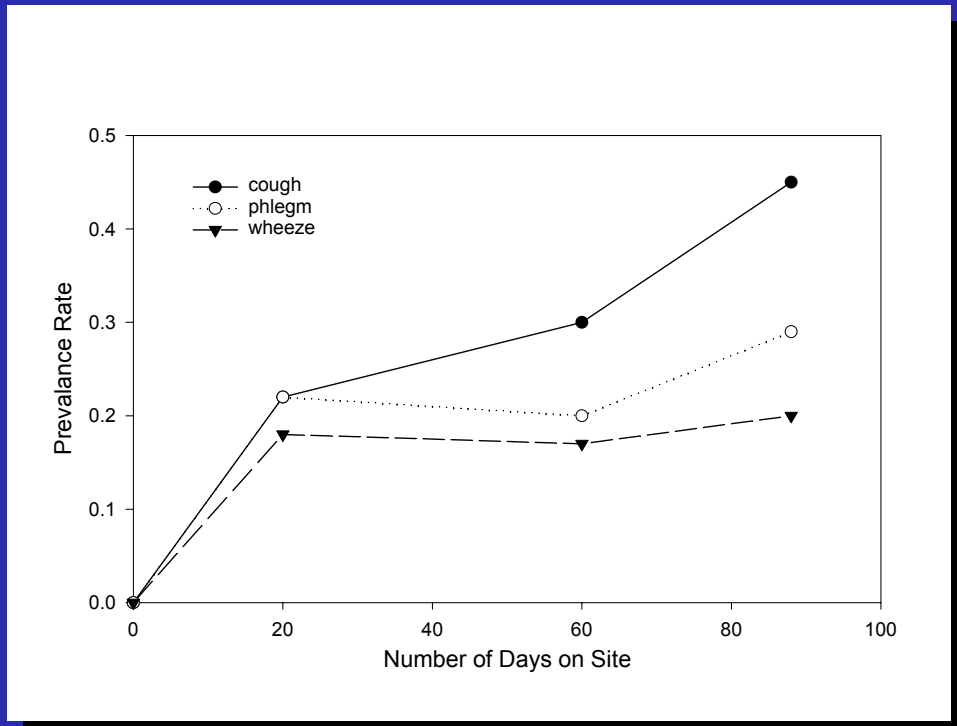
- Determine the incidence of new-onset asthma and other respiratory symptoms after 9/11 in persons living near the WTC site compared to a control area.
- Determine the lung function in residents with new-onset respiratory symptoms after 9/11 in residents near the WTC site compared to a control area.

Summary

- Increased rate of respiratory sx and medical care in "previously normal" residents living near Ground Zero compared to a control population.
- Respiratory symptoms were more persistent in a cohort of "previously normal" residents living near Ground Zero compared to those in a control area.
- Despite the presence of "persistent symptoms," these subjects failed to demonstrate statistically significant differences in screening spirometry compared to asymptomatic residents.
- Previously "normal" subjects with "new onset, persistent symptoms" frequently demonstrated BHR.

Respiratory Effects in Workers

Clean-up and Recovery



Unpublished data

Firefighters

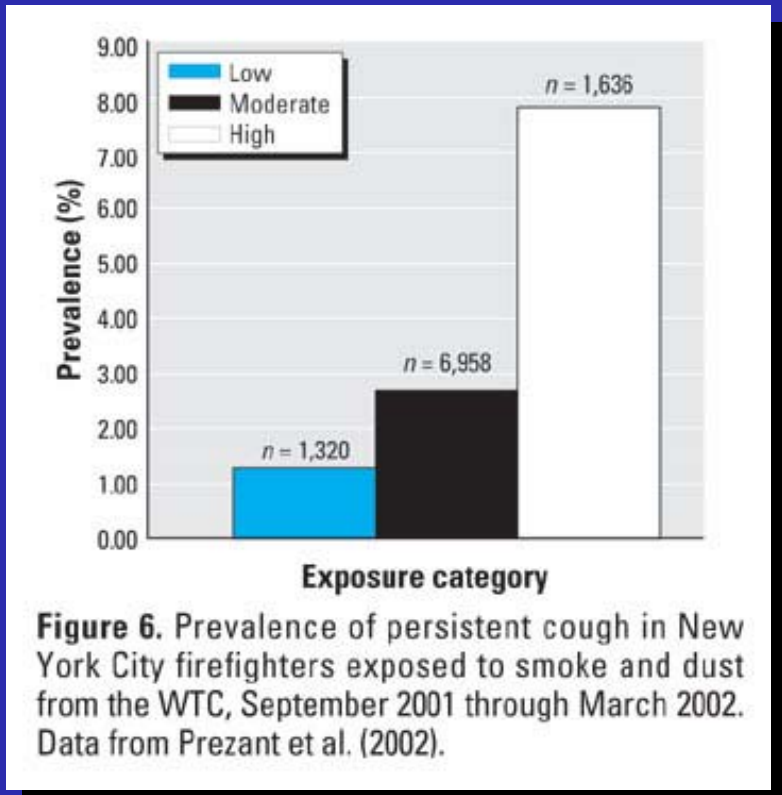


Figure 6. Prevalence of persistent cough in New York City firefighters exposed to smoke and dust from the WTC, September 2001 through March 2002. Data from Prezant et al. (2002).

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Pregnancy Outcomes

Table 2. Pregnancy outcomes in relation to the attack on the WTC, September 2001 through June 2002.

	WTC group	Control group	*p*-Value
No.	187	2,367	—
Mean gestational age (weeks)	39.1	39.0	0.55
Mean birth weight (g)	3,203	3,267	0.14
Frequency of preterm birth (%)	9.9	9.2	0.76
Frequency of low birth weight (%)	8.2	6.8	0.47
Frequency of SGA infants (%)	8.2	3.8	< 0.01

Data from Berkowitz et al. (2003).

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Outreach Activities

2002

- **Community Outreach to make the air monitoring database accessible to the public and develop a "short course" to enable people to understand and interpret the data (Columbia)**
- **Community outreach in coordination with the PEHSU at Mount Sinai to develop an independent compilation of data into Fact Sheets; listserv; newsletter; website (MSSM)**
- **Outreach to worker populations that includes focus groups to identify concerns, newsletters and risk communication panel Worker groups (JHSPH)**
- **Community outreach focused on increasing awareness of the potential environmental health effects through New Jersey Town meetings (UMDNJ)**
- **Community outreach using public forums; newsletter; video development; web pages (NYU)**

Outreach Activities

2003

- **Community outreach in coordination with the PEHSU at Mount Sinai to provide pediatric environmental health consultation; devlop pediatric environmental health educational materials; develop train the trainer workshops aimed at pediatric leaders (MSSM)**
- **Outreach to develop media strategy to address pre-event; event; and post event information/entertainment oriented products to help people of all life-ages learn coping methods against panic associated with terror (JHSPH)**
- **Community outreach to develop a training tool titled "Case studies of the public health response to WTC (UMDNJ)**
- **Community outreach using public forums; newsletter; video development; web pages (NYU)**

Examples of Collaborative Efforts

- Development of a Public WTC Exposure Database
- Development of WTC Brochures
- Community Forums
- Publications
- Joint Scientific/Planning Meetings

MOUNT SINAI SCHOOL OF MEDICINE

pehsu

Mount Sinai 150th Anniversary

Mount Sinai Pediatric Environmental Health Specialty Unit
WTC Asbestos Fact Sheet

This fact sheet answers frequently asked health questions (FAQs) about asbestos. It is part of a series of fact sheets describing potential health risks to children from exposures related to the World Trade Center.

WORLD TRADE CENTER

ENVIRONMENTAL IMPACT RESEARCH

COMMUNITY UPDATE

These investigations by the various university programs are being conducted as collaborative efforts with coordination by the NIEHS are described on the following pages.

The Health and Environmental Impact of the World Trade Center Disaster

FOR MORE INFORMATION

- National Institute of Environmental Health Sciences (NIEHS)
- U.S. Environmental Protection Agency (EPA)
- Agency for Toxic Substance and Disease Registry (ATSDR)
- Occupational Safety and Health Administration (OSHA)
- New York City Department of Health (NYCDOH) (718-DEP-HELP)
- Centers for Disease Control and Prevention (CDC)
- Federal Emergency Management Agency (FEMA)
- New York University School of Medicine, Department of Environmental Medicine
- Environmental and Occupational Health Sciences Institute (EOHSI), University of Medicine and Dentistry of New Jersey (Rutgers University)
- Columbia Center for Children's Environmental Health
- Hunter College
- Mount Sinai School of Medicine
- Johns Hopkins School of Public Health
- University of North Carolina
- Asthma Moms

Please feel free to contact the speakers present on today's panel for more information. E-mail addresses have been included for each speaker. If you need additional information on how to contact speakers or have any questions about this forum, please contact Lisa Schwartz (845) 731-3532 or at lisa@nwe.med.nyu.edu

WORLD TRADE CENTER FORUM:

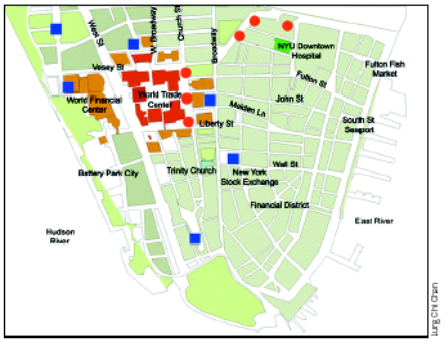
ENVIRONMENTAL HEALTH RESEARCH UPDATE

NIEHS

Thursday, October 17, 2002
7:00 - 10:00 PM

The Borough of Manhattan Community College
Tribeca Performing Arts Center
Theater 1
199 Chambers Street

New York University • A Private University in the Public Service



Lower Manhattan, New York: red circles, samples gathered on Sept 12, 2001; purple squares, samples gathered on Sept 13, 2001

RESIDENTS AND CONTEXT

World Trade Center cough

Lung Chi Chen, George Thurston

The devastating collapse of the World Trade Center on Sept 11, 2001, had unprecedented implications for the environment. The collapse released millions of tonnes of material into the air from pulverised and incinerated building materials, furniture, equipment, and unburned jet fuel. The dust cloud from the collapse enveloped a large area around the World Trade Center, and penetrated many buildings in lower Manhattan. Additional pollutants were released by the ensuing fire, which persisted until Dec 20, 2001, and by the recovery and clean-up processes, which continued until the middle of 2002. Immediately after the collapse, thousands of survivors, residents, workers, students, and commuters, along with policemen, firemen, health-care workers, and civilian volunteers, were exposed to high concentrations of gaseous and particulate matter air pollution, including soot and dust.

We felt it was critically important to characterise the particle exposure environment with respect to the chemical nature and health impact of particles that existed immediately after the collapse, and to examine the continuing air quality concerns around the World Trade Center. The findings from these studies may facilitate early detection of potential health effects. One of the main mysteries surrounding this pollution was the "World Trade Center cough" that was reported by many local residents, in apparent conflict with many government pronouncements of "safety" in the days after the disaster. Our environmental measurements provide a possible explanation for this disparity between the government reassurances and the symptoms reported by local residents, workers, students, and World Trade Center workers.

Images of dust-covered survivors, firefighters, and rescue workers immediately raised our concerns of the health consequences of exposure to an enormous concentration of dust, which may have contained toxic material. For example, although most World Trade Center buildings did not use asbestos, the lower floors were built before a rule against its use was in place, so asbestos was a possible concern. Other compounds of potential concern were fibreglass, dioxin, and other chlorinated compounds (eg, from the burning of plastics), freon, heavy metals, and volatile gases (eg, benzene) from building materials soaked in jet fuel. At the immediate urging of the US National Institute of Environmental Health Sciences, we sent a team of technicians and students to collect dust samples at a number of locations in the area immediately adjacent to the World Trade Center site, and at nearby sites in lower Manhattan east, west, north, and south of the epicentre (Ground Zero) on the days after the collapse. All samples were collected from undisturbed surfaces, such as the top of a car, windowsills, or on sidewalks. The locations where we collected these dust "fallout" samples are displayed in the map.

Although most governmental agency and other research efforts centred on Ground Zero, we focused on community exposures to the particle pollution emanating from the site fires, the resuspension of settled dusts during rescue, recovery, excavation, and clean-up activities, and from the combustion particles produced by the diesel trucks at Ground Zero. We therefore set up an air quality monitoring station at a nearby hospital to measure ambient particulate matter concentrations in the community. These detailed ambient air measurements included hourly elemental carbon soot, the mass of particulate matter less than 10 μm in diameter, the concentrations of airborne particulate matter smaller than 2·5 μm in diameter, and data from a size-fractionated mass impactor. The samplers were located at New York University Downtown Hospital, which was ironically established in response to a terrorist attack in the financial district on Sept 16, 1920. These particulate matter samples have since been analysed for their constituents to determine the metal and organic contents after the collapse.

The US Environmental Protection Agency also started collecting samples of particulate matter around Ground Zero, including many measurements of ambient asbestos. Although the agency focused its measurements of the mass of particulate matter on the usually most toxic smaller particles (<2·5 μm), our analyses were more expansive, looking at the characteristics of the dust and

Lung Chi Chen and George Thurston are associate professors of environmental medicine at the NYU School of Medicine, Lung Chi Chen is an expert in inhalation toxicology. George Thurston is the Director of Community Outreach at the Department of Environmental Medicine and is an expert in epidemiological analyses of the health effects of air pollution. Department of Environmental Medicine, NYU School of Medicine, Tuxedo, NY, USA (L C Chen PhD, G Thurston sc) (e-mail: chenl@nyu.med.nyu.edu)

AMERICAN JOURNAL OF INDUSTRIAL MEDICINE 42:560–565 (2002)

Commentary

Lessons Learned on Environmental, Occupational, and Residential Exposures From the Attack on the World Trade Center

Paul J. Lioy, PhD,* and Michael Gochfeld, MD, PhD

KEY WORDS: exposure monitoring; acute health effects; respirators; indoor environment

UMDNJ

RUTGERS

A WTC Community Forum for "NJ to NYC" Commuters

ALL ARE WELCOME!

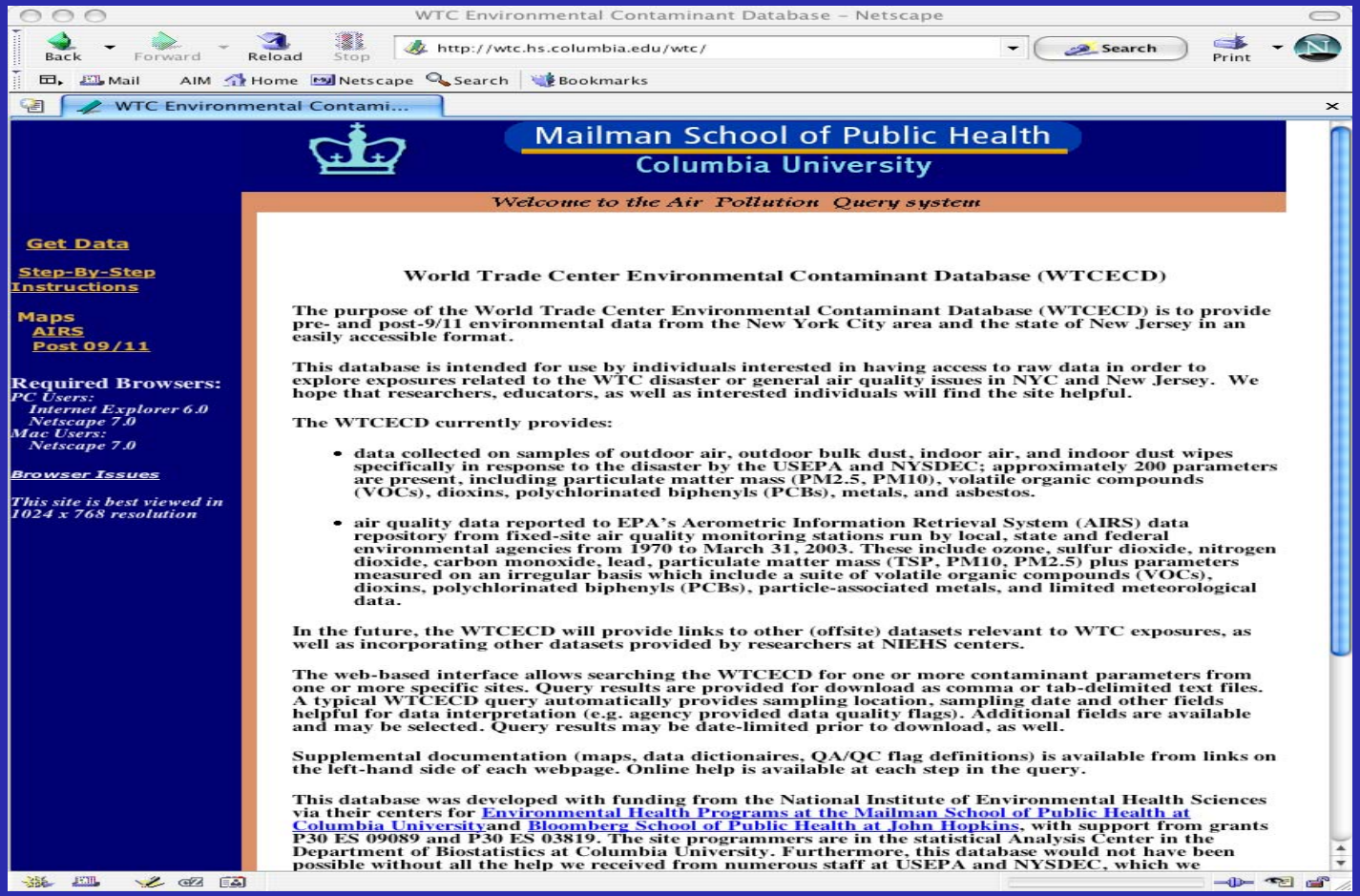
Tuesday

December 10, 2002

Tentative Agenda

- Welcome, Joe Bartlett, WOR-AM (invited)
- WTC Environmental Health Research
  Michael Gallo, UMDNJ

WTC Environmental Contaminant Database



http://wtc.hs.columbia.edu/

WTC Environmental Contaminant Database

Phase I - Complete

- provide a user friendly resource for accessing environmental contaminant data collected pre- and post- 9/11
- incorporate data collected by the USEPA and other agencies in response 9/11
- incorporate routinely collected air quality data pre-9/11 for the New York City and the State of New Jersey

Phase II – In progress

- to incorporate WTC exposure data collected by each participating NIEHS Center into the existing post 9/11 relational database

WTC Environmental Contaminant Database

EPA AIRS Dataset 1970-2003

Database	State	Number of sites	Number of pollutants	Number of records
AIRS	NJ	241		20,389,57
	NYC	132		11,513,178
AIRS Total:		**373**	**262**	**31,902,748**

Post-9/11 Dataset 9/11/2001 – 7/31/2002

Database	State	Number of sites	No of pollutants	Number of samples	Number of results
Post 09/11	NJ	7		191	1,157
	NYC	214		26,824	208,380
Post 09/11 Total:		**221**	**347**	**27,015**	**209,537**

Contributing Agencies

AIRS

- **US EPA National Exposure Research Lab**
- **New Jersey State Department of Environmental Protection**
- **New York State Department of Environmental Conservation**
- **NY State Lead Sampling Lab**
- **Research Triangle Institute RTP, NC**
- **Radian Corporation**
- **Eastern Research Group**
- **US EPA/OAQPS/Mqag**
- **College of Staten Island**

Post 09/11

- **USEPA**
- **NYSDEC**
- **NYSDOH**

Data Queries

- Can preview monitoring sites for multiple NY and NJ counties
- Can select AIRS or post 9/11: if post 9/11 can select multi media
- Can investigate what is measured at specific sites
- Can select multiple contaminants for each selected site
- Can find out which sites measured each contaminant
- Can limit data range or Auto-Populate Date Words vs Codes (AIRS only)